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ABSTRACT

Methods and apparatus for profiling the execution of a computer program. The program is executed on a computer, without the program having been compiled for profiled execution. The program is coded in an instruction set in which an interpretation of an instruction depends on a processor mode not expressed in the binary representation of the instruction. The computer includes instruction pipeline circuitry configured to execute instructions of the computer, and profile circuitry configured to detect and record, without compiler assistance for execution profiling, profile information describing a sequence of events occurring in the instruction pipeline. During a profile-quiescent interval of execution of the program that induces events that match time-independent selection criteria of profileable events to be profiled, the profile circuitry records no profile information in response to the occurrence of profileable events. After a triggering event is detected, the profile circuitry commences a profiled execution interval, and records profile information describing every event during a profiled execution interval that matches the time-independent profileable event selection criteria induced during the profiled execution interval. The profiled information includes at least all events of the two classes (i) a divergence of execution from sequential execution, and (ii) a processor mode change that is not inferable from the opcode of the instruction that induces the processor mode change taken together with a processor mode before the mode change instruction the recording continuing until a predetermined stop condition is reached. The recorded profile information is efficiently tailored to annotate the profiled binary code with sufficient processor mode information to resolve mode-dependency in the binary coding, and indicates contiguous ranges of sequential instructions executed during a profiled interval by low and high boundaries of the contiguous ranges, indicating the high boundary by the address of the last byte of the range. The profile information further identifies each distinct physical page of instruction text executed during the execution interval.